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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/776,503	02/12/2004	Masato Naito	2927-0167P	3677

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EXAMINER	
LEIVA, FRANK M	

ART UNIT	PAPER NUMBER
3714	

NOTIFICATION DATE	DELIVERY MODE
12/11/2008	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

Office Action Summary	Application No.	Applicant(s)	
	10/776,503	NAITO ET AL.	
	Examiner	Art Unit	
	FRANK M. LEIVA	3714	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 November 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments, see after-final remarks, filed 12 November 2008, with respect to the ambiguity of the rejection filed 12 August 2008 have been fully considered and are persuasive. The entire office action has been withdrawn and a new final action redacted herewith.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Soong (US 5,931,746) in view of Galloway et al (US 6,354,962 B1).

4. Soong discloses a method of designing a club using a finite element modeling of a golf ball impacting a club head face.

5. Galloway discloses the use of experimental data to calculate stresses in a club head face and adjusting the thickness according to the stress data and Coefficient of Restitution (COR) data.

6. **Regarding claim 1;** Soong discloses a method of designing a golf club head by using a computer, comprising the steps of using a club head model and

a ball model both of which are composed of a plurality of divided finite elements, (fig. 3 and col. 3:58-64); executing a simulation of impacting said club head model against said ball model at a reference hitting position set in a sweet area of a face part of said club head model and a plurality of comparison hitting positions set outside said sweet area, (fig. 3 and col. 3:58-4:10), wherein the circular plate 41 is the sweet spot, and the finite element of an impact simulation must have a model of both objects being impacted, that is the ball and the club head. Soong uses deflection distance D from which along with (col. 4:50-65) known material stress factors, can calculate the thermal stresses in the model, thus; computing a stress generated in each of said finite elements by an analysis based on a finite element method, when said club head model impacts said ball model at said reference hitting position and said comparison hitting positions; Soong is silent to controlling a thickness distribution across the face of the head, but Galloway discloses controlling a thickness distribution of each of said finite elements, by comparing said stress generated at each of said comparison hitting positions with said stress generated at said reference hitting position, (fig. 24) is a graphical representation of a comparison of hitting positions at different thicknesses; and if said stresses generated at said comparison hitting positions are larger than said stress generated at said reference hitting position, portions of said element disposed at said comparison hitting positions are thickened, whereas if said stresses generated at said comparison hitting positions are smaller than said stress generated at said reference hitting position, portions of said element disposed at said comparison hitting positions are thinned, whereby said stresses generated at said comparison hitting positions are approximated to said stress generated at said reference hitting position, (fig. 24) shows by increasing the thickness the tress is reduced; and whereby said stress generated at said reference hitting position and said stresses generated at said comparison hitting positions are made uniform, (fig. 24) where the convergence of the reference positions show the same value stresses or uniformity across the face. It would have been obvious to one of ordinary skill in the art at the time of

applicant's invention to use a mathematical model instead of an experimental data to calculate the different thicknesses across the face of the golf club and reduce cost of development; and by using the data available from Soong and Galloway, and as expressed by Galloway to maximize elasticity without compromising the structural stress limits of the materials by thickening certain areas of the face.

7. **Regarding claim 2;** As applied above, the combination of Soong and Galloway discloses all the limitations recited in claim 1, from which claim 2 depends on, and Galloway further discloses wherein said club head model consists of a wood club head model a control of said thickness distribution of each of said finite elements is executed by controlling a thickness of a metal plate composing said face part of said wood club head model, (col. 8:44-50).

8. **Regarding claim 3;** As applied above, the combination of Soong and Galloway discloses all the limitations recited in claim 1, from which claim 3 depends on, and Galloway further discloses wherein a Mises' stress generated in each of said elements when said ball model is hit with said club head model is computed from a main stress value at an integration point of each of said elements; and a maximum value of said Mises' stress at each of said hitting positions is computed from a change of a time series of said found Mises' stress, and a part of said face part disposed at said comparison hitting position generating a smaller maximum value of said Mises' stress than a maximum value of said Mises' stress at said reference hitting position is thinned, whereas a portion of said face part disposed at said comparison hitting position generating a larger maximum value of said Mises' stress than said maximum value of said Mises' stress at said reference hitting position is thickened, (fig. 28) showing variations in thickness and related stress accordingly.

9. **Regarding claim 4;** As applied above, the combination of Soong and Galloway discloses all the limitations recited in claims 1 and 2, from which claim 4 depends on, and Galloway further discloses wherein a Mises' stress generated in each of said elements when said ball model is hit with said club head model is computed from a main stress value at an integration point of each of said elements; and a maximum value of said Mises' stress at each of said hitting positions is computed from a change of a time series of said found Mises' stress, and a part of said face part disposed at said comparison hitting position generating a smaller maximum value of said Mises' stress than a maximum value of said Mises' stress at said reference hitting position is thinned, whereas a portion of said face part disposed at said comparison hitting position generating a larger maximum value of said Mises' stress than said maximum value of said Mises' stress at said reference hitting position is thickened, (fig. 28) showing variations in thickness and generated related stresses accordingly.

10. **Regarding claims 5 and 6;** As applied above, the combination of Soong and Galloway discloses all the limitations recited in claims 1-4, from which claims 5 and 6 depend on, and Galloway further discloses wherein when said ball model is hit with said club head model at an initial speed of 40m/second a maximum value of said Mises' stress generated at said reference hitting position and a maximum value of said Mises' stress generated at said comparison hitting positions is computed, a thickness of said element disposed at said comparison hitting position is altered so that a difference between said maximum value of the Mises' stress generated at said reference hitting position and said maximum value of the Mises' stress generated at said comparison hitting positions is not more than 8 kgf/mm^2; and a simulation of impacting said club head model against said ball model is repeatedly executed to decide said thickness distribution, as shown in the specifications the speed of impact simulated and the maximum stress for generating the output are simply arbitrary, yet, (col. 9:36-59); Galloway goes farther to explain that the maximum stress for the Great Big

Bertha being used as the reference is 29 ksi (kilo pound force/ in^2) or 20.38 Kgf/mm^2, and that the testing should not exceed it, making the 8 kgf/mm^2(or 11.37 ksi), within range.

11. **Regarding claim 7;** As applied above, the combination of Soong and Galloway discloses all the limitations recited in claim 1, from which claim 7 depends on, and Galloway further discloses wherein said reference hitting position is located inside a sweet area of said face part, and said comparison hitting position is formed at not less than three points outside said sweet area; and said reference hitting position is located in a region surrounded with straight lines connecting said comparison hitting positions, (fig. 24), where the graphs represent face center, face crown and face sole, located in three different levels from center of sweet spot.

12. **Regarding claims 8-10;** As applied above, the combination of Soong and Galloway discloses all the limitations recited in claims 1-4, from which claims 8-10 depend on, and Galloway further discloses wherein said reference hitting position is located inside a sweet area of said face part, and said comparison hitting position is formed at not less than three points outside said sweet area; and said reference hitting position is located in a region surrounded with straight lines connecting said comparison hitting positions, (fig. 24-28), where all comparison hitting positions are graphed within the center area and connected with straight lines.

13. **Regarding claims 11-15;** As applied above, the combination of Soong and Galloway discloses all the limitations recited in claims 1-5, from which claims 11-15 depend on, and Galloway further discloses wherein said comparison hitting position is formed at two points, with one point disposed upward from said reference hitting position and the other point disposed downward therefrom, and at two points with one point disposed at a left-hand side of said reference hitting

position and the other point disposed at a right-hand side thereof, (fig. 1A) showing H and W directions, (col. 3:15-25), showing the values used in the graph for calculating aspect ratio, and being that the graphical data compares all points of the surface area in a finite element analysis.

Examiner's Note

14. It is understandable that the examiner has already combined the features of a simulated mathematical modeling of an impact between a simulated golf ball and a simulated golf club head of Soong, to provide the data used in Galloway, and that all of the combined invention of Soong and Galloway is done through the simulation of the impact, for once deduced that it is cheaper to simulate than to create elaborate inaccurate physical tests, one of ordinary skill would be incline to used the generated simulated data to design the club face, and that the thickness changes across the face place of the center of the club head, are teachings from Galloway.

15. Examiner has cited paragraphs and figures in the references as applied to the claims above for the convenience of the applicant. Although the specified citations are representative of the teachings in the art and are applied to the specific limitations within the individual claim, other passages and figures may apply as well. It is respectfully requested from the applicant, in preparing the responses, to fully consider the references in entirety as potentially teaching all or part of the claimed invention, as well as the context of the passage as taught by the prior art or disclosed by the examiner.

16. Examiner has used conversions to match the art of record with the applicant's values as follows;

1 Kilo pound force/in^2 = .703 Kilogram force/mm^2.

1 meter/second = 2.237 mph

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to FRANK M. LEIVA whose telephone number is (571)272-2460. The examiner can normally be reached on M-Th 9:30am - 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Peter D. Vo can be reached on (571) 272-4690. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

FML
12/07/2008

/Scott E. Jones/
Primary Examiner, Art Unit 3714